accompanied Captain Cook on his second voyage, not brothers, as inadvertently stated by Dr. King) for the bread-fruit tree, with which they became familiar in the Pacific Islands. This they called *Artocarpus communis*, though most subsequent botanists have adopted the later Linnean name, *A. incisa;* and the younger Forster published a separate illustrated memoir on it, in German, entitled "The History and Description of the Bread-fruit Tree." Dampier, however, appears to have been the first to make this valuable tree known to Europeans. The only other familiar species of the genus is the Jak fruit (*Artocarpus integrifolia*), a prominent cultivated tree in the Malay peninsula and archipelago, and recently collected by Colonel Beddome in a wild state in the forests of the Western Ghats in the Deccan Peninsula, South India. Exclusive of this, Dr. King now describes and figures seventeen species found within the limits of British India, seven of which are described for the first time. Many of them are very handsome trees, but their wood is of little value, and, as far as their history goes, none yields an edible fruit.

The Indo-Malayan species of *Quercus* and *Castanopsis* number 82 and 22 respectively, besides some imperfectly-known species. As Dr. King remarks, there is no reason, except convenience and the desirability of not adding to the already overloaded synonymy, why all the species described under *Castanopsis* should not be placed in the section *Chlamydobalanus* of *Quercus*. Generally speaking, *Castanopsis* differs from *Quercus* in the involucre, which answers to the cup of the acorn, being prickly or tubercular, and completely inclosing the nut, and when ripe splitting irregularly to free the nut. But this distinction completely breaks down in the long series of species illustrated in the present monograph, the cup or involucre varying, in the species referred to *Quercus*, from two or three series of scales, or a discoid form, to an ovoid or globose receptacle completely enveloping the nut, and sometimes more or less prickly. In *Castanopsis*, on the other hand, the involucre is sometimes quite smooth. In foliage there is nothing to distinguish them, yet, taking the whole series of species, these Asiatic oaks exhibit a wonderful and beautiful variety in foliage and fruit, especially in the latter, being in many of them exceedingly elegant in shape and structure. There are about half-a-dozen species of the same group (*Lepidobalanus*) as the British oak, but none has quite the kind of foliage characteristic of this, and some have leaves more like an apple-tree, others almost exactly the same as the sweet chestnut. In other groups the leaves are often very large, thick, and leathery, having entire margins. Like some of the oaks of Central America, some of the Indian species have acorns of enormous size. One of the handsomest trees of the Eastern Himalayas, at elevations of 5000 to 8000 feet, is *Quercus lamellosa*. It grows from eighty to a hundred feet high, and in young vigorous specimens the conspicuously veined leaves are as much as a foot long, and the depressed spheroidal cups or involucres are 2½ inches in diameter, enveloping all but the apex of the nut, and built up of broad concentric plates, thin towards the usually fimbriate edge. The figures illustrating this species in Dr. King's monograph are partly copied from Hooker's "Illustrations of Himalayan Plants," though this fact is not mentioned, which is apparently an oversight, as all other copies that we have noticed are acknowledged. Running through the plates from the beginning, we will indicate a few of the more striking. Thus, *Quercus semecarpifolia* (Plate 15), has globose acorns with the cup reduced to a small disk at the base; *Q. serrata* (Plate 16) is remarkable for having the acorn almost buried in a cup of long narrow scales; *Q. oidocarpa* has an ovoid acorn with a closely-fitting cup, at least two-thirds of its length, and consisting of a few elegantly notched broad plates; *Q. Kunstleri* (Plate 31) has the long narrow acorns in spikes, and seated in shallow cups similar to those of the common oak; *Q. grandifrons* (Plate 35), has broad leaves sometimes 15 to 18 inches long, and *Q. Scortechinii*, on the same plate, has a mossy cup containing a huge obovoid acorn; *Q. platycarpa* (Plate 65) has very flat acorns half immersed in the thin cup, and about an inch and a half across; *Q. cyclophora* (Plate 67) is somewhat similar, but the cup is very thick, and composed of very numerous rounded scales; in *Q. reflexa* (Plate 72) the cone-shaped acorns are borne in clusters, and entirely inclosed in a thin cup completely beset with short recurved prickles; *Q. Junghunii* (Plate 73) is so like a *Castanopsis* in its unsymmetrical prickly fruit as to be undistinguishable from it; and, finally, *Q. Beccariana* (Plate 78) presents a fruit more resembling the nest of a solitary wasp than an acorn, being an oblong body about three inches long by two broad, the cup entirely inclosing the acorn, and consisting of about four very broad overlapping layers of scales with thin edges.

Apart from the practical use of Dr. King's monograph, this long series of figures of the Indian oaks offers a most interesting opportunity to the student of evolution, especially if it be remembered that the figures are portraits of individual specimens, not embodiments of "species," and that another series of specimens of the same "species" would probably exhibit many intermediate modifications.

It is fortunate for science that Dr. King, supported by the Indian Government, should devote his time and talents to the elucidation of such large and difficult arboreous genera as *Ficus* and *Quercus*. These monographs are of the greatest value to botanists generally, and one would say specially valuable to the officers of the Forest Department of India. The drawings by native artists, are, as already stated, with few exceptions, original, very faithfully executed, and mostly sufficient for purposes of identification. The lithography, too, by the Government School of Art, Calcutta, deserves praise, comparing favourably with much of the work done in this country. We may perhaps be permitted to call attention to the fact that the copies we have seen of the present volume are printed on smaller paper than the first, which detracts from their appearance on the shelves.

W. BOTTING HEMSLEY.

OUR BOOK SHELF.

Elementary Text-book of Trigonometry. By R. H. Pinkerton, M.A. New Edition. (London: Blackie and Son, Limited, 1890.)

THIS is a new and enlarged edition of this excellent elementary text-book. An account of the method of proportional parts and of its application to logarithmic and trigonometrical tables has been added, together with a collection of questions in trigonometry which have been

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set during the last ten years in examination papers of the Science and Art Department in mathematics, second stage, and of the London University Intermediate Examination in Arts.

Instead of each paper being given separately, the questions in them are arranged under headings, and the source from which each is taken is indicated; and, to avoid the necessity of a book of tables, the logarithms required for their solution are given in a table at the end.

Throughout the work the author has explained most clearly and fully every part that might in any way prove difficult to the beginner, and he has added numerous well-chosen examples at the conclusion of each chapter.

Higher Geometry. Containing an Introduction to Modern Geometry and Elementary Geometrical Conics. By W. J. Macdonald, M.A. (Edinburgh: James Thin, 1890.)

MANY of the more advanced theorems in geometry, which are not very often treated to any extent in elementary books, are here dealt with. The author's idea seems to have been to connect the theorems together as much as possible in a continuous and graduated series; and this, together with the fact that they are worked out in a neat and concise form, will greatly add to the utility of the book.

The latter part of the work treats of geometrical conics. Although it does not contain so many propositions as many of the elementary works on the subject, yet the author has included in it all the most important propositions, thus making it a brief course for those who are about to attack the subject for the first time. Many problems have been put in here and there among the propositions, and an index to definitions, which has been added at the end, ought to prove handy for reference.

Nautical Surveying. By the late Vice-Admiral Shortland, LL.D. (London: Macmillan and Co., 1890.)

THIS volume, which is published by the late Admiral's widow and children, relates chiefly to the errors to which surveyors and their instruments are liable. It shows how these errors are to be found and corrected. The book is not one for beginners, but appears to have been written rather for surveyors themselves, after they have become thoroughly acquainted with the more practical and simple surveying. Every branch of surveying is thoroughly discussed, but at such length that the work would be of little practical use to a beginner. An index would greatly improve the book.

An American Geological Railway Guide. By James Macfarlane, Ph.D. Second Edition. (New York: D. Appleton and Co., 1890.)

THE first edition of this book appeared in 1878, and the object of the compiler was to provide travellers with a hand-book from which they might learn the geological structure of every district in America intersected by railways. Many changes and additions have, of course, become necessary since 1878; and at the time of his death, in 1885, Dr. Macfarlane had made extensive preparations for a new edition. His work has been completed by his son, Mr. James R. Macfarlane, who has had the advantage of being aided by various competent contributors and advisers. The idea of the book is excellent, and has been carried out with great care and intelligence. It relates to the Dominion of Canada, as well as to the United States, and anyone travelling in these countries may find out at once, by turning to the proper page of this volume, the geological significance of phenomena that may happen to attract attention during the journey. The work ought to do much to encourage a liking for geology in the New World; and even professional geologists may find it useful for occasional reference.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Araucaria Cones.

I SHOULD be glad to know through any of your correspondents whether the Araucaria is often known to bear cones in the British Islands?

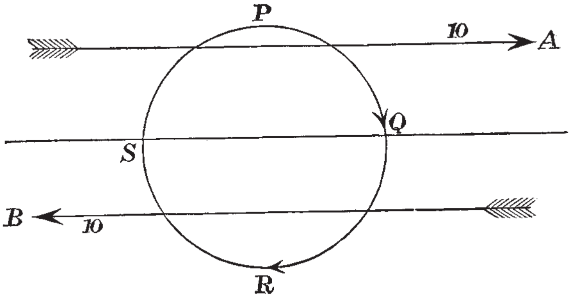
A plant of the common Araucaria in my garden here was blown down in a severe gale two years ago. It was a well-grown plant about 20 feet high, and very healthy. I replaced it on the spot, supporting it by ropes well pinned down.

This autumn it has come out covered with cones all over the top branches. I have never seen them before, and I think they must be rare. They are terminal on the branches which bear them—sit upright upon them—and are of a very handsome ovate form. No scales are visible—the actual seed-vessels being covered and concealed by a thick coating of modified leaves or needles, narrowed, elongated, and terminating in hooked bristles. ARGYLL.

Inveraray.

On the Soaring of Birds.

IT is a pity that so many of your correspondents on this subject fail to grasp the elementary and self-evident fact that no common horizontal movement, relatively to the surface of the earth, of the air in which a bird is immersed can by any possibility enable it to soar. Upward convection-currents and upward slants may have something to do with the question, as may also the existence of different horizontal currents.



Thus, let there be two horizontal currents, A and B, in opposite directions, of 10 miles an hour each, and let a bird arrive at Q, down the path PQ, moving through the air at Q with a velocity of 5 miles an hour. On passing into the current B, it has a velocity relative to B of 20 miles an hour in the direction of current A, and of 5 miles an hour in a perpendicular direction. By proper adjustment of the wings, this relative velocity can be converted into work, and spent in lifting the bird to a higher altitude, so that, on arriving at S, its velocity relatively to the A current is again reduced to 5 miles an hour, and the circumstances at Q are exactly reproduced. When Mr. Magnus Blix began his communication (August 21, vol. xlii. p. 397) I expected that he was going to suggest this explanation; but though he commences with the supposition of the bird passing from one current to another, he goes on as if the bird afterwards remained constantly in one current.

An upward convection-current, as suggested by Mr. O. Fisher (September 4, p. 457), is, no doubt, a *vera causa* for a bird's being assisted in floating; but has Mr. Fisher reflected or calculated whether it is an adequate cause for actual soaring? Natural convection-currents can seldom have a rate of more than a few feet per second, whereas a velocity of 20 feet per second would be required to support a bird which weighed 1 pound for every square foot of supporting surface—wing, tail, and body. It is true that, in soaring, the rapid horizontal motion probably increases the horizontal support of the air, just as the transverse motion of the sails of a windmill through the air-current propelling

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